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US5572643: Web browser with dynamic display of information objects during linking

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Abstract: A method of browsing the Worldwide Web of the Internet using an HTML-compliant client supporting a graphical user interface and a browser. The method begins as a web page is being displayed on the graphical user interface, the web page having at least one link to a hypertext document preferably located at a remote server. In response to the user clicking on the link, the link is activated by the browser to thereby request downloading of the hypertext document from the remote server to the graphical user interface of the client. While the client waits for a reply and/or as the hypertext document is being downloaded, the browser displays one or more different types of informational messages to the user. Such messages include, for example, advertisements, notices, messages, copyright information and the like.

Primary/Assistant Examiner: **Zimmerman; Mark K.; Fetting; Anton W.**

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U.S. References:

Show the 281 patents that reference this one

Patent	Issued	Inventor(s)	Applicant(s)	Title
<u>US4782463</u>	11 /1988	Sanders et al.	International Business Machines Corp.	<u>Method for generating display screens for a set of application programs by calling screen management subroutines</u>
<u>US4827508</u>	5 /1989	Shear	Personal Library Software, Inc.	<u>Database usage metering and protection system and method</u>
<u>US4833308</u>	5 /1989	Humble	Advance Promotion Technologies, Inc.	<u>Checkout counter product promotion system and method</u>
<u>US4953209</u>	8 /1990	Ryder, Sr. et al.	International Business Machines Corp.	<u>Self-verifying receipt and acceptance system for electronically delivered data objects</u>
<u>US5204947</u>	4 /1993	Bernstein et al.	International Business Machines Corporation	<u>Application independent (open) hypermedia enablement services</u>
<u>US5297249</u>	3 /1994	Bernstein et al.	International Business Machines Corporation	<u>Hypermedia link marker abstract and search services</u>
<u>US5355472</u>	10 /1994	Lewis	International Business Machines Corporation	<u>System for substituting tags for non-editable data sets in hypertext documents and updating web files containing links between data sets corresponding to changes made to the tags</u>
<u>US5359708</u>	10 /1994	Bloomer et al.	International Business Machines Corp.	<u>Dynamic in a document processing system for dynamically locating format controls and determining formatting information in effect before and after each format control</u>
<u>US5367621</u>	11 /1994	Cohen et al.	International Business Machines Corporation	<u>Data processing method to provide a generalized link from a reference point in an on-line book to an arbitrary multimedia object which can be dynamically updated</u>
				<u>Information processing apparatus capable of opening two or more</u>

<u>US5367623</u>	11 /1994	Iwai et al.	Sharp Kabushiki Kaisha	<u>windows on screen, one window containing a page and other windows containing supplemental information</u>
<u>US5408659</u>	4 /1995	Cavendish et al.	International Business Machines Corporation	<u>Link pane class and application framework</u>
<u>US5412772</u>	5 /1995	Monson	Novell, Inc.	<u>System for permitting a view of an object or a user interface to be exchanged between operating system environments</u>
<u>US5428529</u>	6 /1995	Hatrick et al.	International Business Machines Corporation	<u>Structured document tags invoking specialized functions</u>
<u>US5438508</u>	8 /1995	Wyman	Digital Equipment Corporation	<u>License document interchange format for license management system</u>
<u>US5442771</u>	8 /1995	Flepp et al.	Prodigy Services Company	<u>Method for storing data in an interactive computer network</u>
<u>US5461667</u>	10 /1995	Remillard	Viscorp	<u>Apparatus and method for electronic device for information services</u>
<u>US5491820</u>	2 /1996	Belove et al.	AT&T Corporation	<u>Distributed, intermittently connected, object-oriented database and management system</u>
<u>US5511160</u>	4 /1996	Robson	Hewlett-Packard Company	<u>Information retrieval device for displaying and directly refreshing the display of a document</u>
<u>US5515490</u>	5 /1996	Buchanan et al.	Xerox Corporation	<u>Method and system for temporally formatting data presentation in time-dependent documents</u>

CLAIMS:
[Hide claims]:

What is claimed is:

1. A method of browsing in a computer network having at least one client connectable to one or more servers, the client having an interface for displaying a first hypertext document with at least one link to a second hypertext document located at a server, comprising the steps of;

- contacting the server in response to activation of the link to initiate downloading of the second hypertext document from the server to the client;
- in response to activation of the link, retrieving an information object that has been stored in the client prior to the activation

of the link; and

- displaying the retrieved information object on the interface during at least a portion of a time period between the activation of the link and completion of the downloading of the second hypertext document from the server to the client to provide information to a user during a process of linking from the first hypertext document to the second hypertext document;
- wherein the information object is stored within the first hypertext document and is not displayed on the interface until after activation of the link that initiates downloading of the second hypertext document from the server to the client.

2. The method of browsing of claim 1 wherein the information object is stored within the first hypertext document using a markup tag that normally specifies a comment within a hypertext document.

3. The method of browsing of claim 2 wherein the markup tag includes nested HTML tags to format the information object within the markup tag.

4. A method of browsing in a computer network having at least one client connectable to one or more servers, the client having an interface for displaying a first hypertext document with at least one link to a second hypertext document located at a server, comprising the steps of:

- contacting the server in response to activation of the link to initiate downloading of the second hypertext document from the server to the client;
- in response to activation of the link, retrieving an information object that has been stored in the client prior to the activation of the link; and
- displaying the retrieved information object on the interface during at least a portion of a time period between the activation of the link and completion of the downloading of the second hypertext document from the server to the client to provide information to a user during a process of linking from the first hypertext document to the second hypertext document;
- wherein the information object includes copyright management information for the second hypertext document.

5. The method of browsing of claim 4 wherein the copyright management information includes terms and conditions for use of a copyrighted work being downloaded from the server to the client.

6. A method of browsing in a computer network having at least one client connectable to one or more servers, the client having an interface for displaying a first hypertext document with at least one link to a second hypertext document located at a server, comprising the steps of:

- contacting the server in response to activation of the link to initiate downloading of the second hypertext document from the server to the client;
- in response to activation of the link, retrieving an information object that has been stored in the client prior to the activation of the link; and
- displaying the retrieved information object on the interface during at least a portion of a time period between the activation of the link and completion of the downloading of the

activation of the link and completion of the downloading of the second hypertext document from the server to the client to provide information to a user during a process of linking from the first hypertext document to the second hypertext document;

- wherein the information object includes an advertisement.

7. The method of browsing of claim 6 wherein the advertisement advertises goods or services described in the second hypertext document.

8. The method of browsing of claim 7 further including the step of queueing the information object to a printer associated with the client to thereby print a coupon for the goods or services.

9. A method of browsing the World Wide Web of the Internet using a client machine supporting a browser, comprising the steps of:

- storing an information object;
- activating a link from a first hypertext document to initiate downloading of a second hypertext document;
- retrieving the stored information object in response to activating the link; and
- displaying the information object during at least a portion of a time period between activation of the link and completion of the downloading of the second hypertext document to provide information to a user of the client machine as the browser links from the first hypertext document to the second hypertext document;
- wherein the information object is stored within the first hypertext document and is not displayed until after activating the link that initiates downloading of the second hypertext document.

10. The method of browsing of claim 9 further including the step of queueing the information object to a printer.

11. The method of browsing of claim 10 wherein the information object is an advertisement.

12. In a computer having a processor, an operating system, a graphical user interface and a browser, the improvement comprising:

- means, responsive to activation of a link from a web page that initiates downloading of a linked hypertext document, for retrieving information masked within the web page; and
- means for outputting the information during at least a portion of a time period between activation of the link and completion of the downloading of the linked hypertext document to provide information a user of the computer as the browser links from the web page to the linked hypertext document.

13. In the computer system as described in claim 12 wherein the information is outputted on the graphical user interface.

14. In the computer system as described in claim 12 wherein the information is masked by an HTML comment tag.

15. In the computer system as described in claim 12 wherein the HTML comment tag includes HTML tags nested therein to format the information.

16. In a computer having a browser for retrieving hypertext objects from servers in a computer network, the browser including

an engine for executing applets, the improvement comprising:

- means, responsive to activation of a link from a hypertext object that initiates downloading of a linked hypertext object, for retrieving an applet downloaded to the computer prior to activation of the link; and
- means for outputting the applet during at least a portion of a time period between activation of the link and completion of the downloading of the linked hypertext object to thereby provide information to a user of the computer as the browser links from the hypertext object to the linked hypertext object.

17. In a computer having a browser for retrieving hypertext objects from servers in a computer network, the improvement comprising:

- means, responsive to activation of a link from a hypertext object that initiates downloading of a linked hypertext object, for retrieving an information object downloaded to the computer prior to activation of the link; and
- means for outputting the information object during at least a portion of a time period between activation of the link and completion of the downloading of the linked hypertext object to thereby provide information to a user of the computer as the browser links from the hypertext object to the linked hypertext object;
- wherein the information object is an advertisement.

18. The computer as described in claim 17 wherein the advertisement is selected based on the link.

19. A method of browsing in a computer network having a plurality of servers that support hypertext objects, comprising the steps of:

- storing a plurality of information objects at a client machine having a browser, wherein the information objects are downloaded to the client machine from the computer network;
- in response to activation of a link that initiates downloading of a hypertext object, selectively displaying one of the stored information objects during at least a portion of a time period between activation of the link and completion of the downloading of the hypertext object to provide information to a user of the client machine during a process of linking to the hypertext object;
- wherein the information objects are advertisements for goods or services.

Background/Summary:

TECHNICAL FIELD

This invention relates generally to computer networks and more particularly to methods for enhancing the operation of a client browser operating in a multi-server computer environment.

BACKGROUND OF THE INVENTION

The worldwide network of computers commonly known as the

The worldwide network of computers commonly known as the "Internet" has seen explosive growth in the last several years. Mainly, this growth has been fueled by the introduction and widespread use of so-called "web" browsers, which allow for simple graphical user interface (GUI)-based access to network servers, which support documents formatted as so-called "web pages". The "World Wide Web" (WWW) is that collection of servers of the Internet that utilize the Hypertext Transfer Protocol (HTTP). HTTP is a known application protocol that provides users access to files (which can be in different formats such as text, graphics, images, sound, video, etc.) using a standard page description language known as Hypertext Markup Language (HTML). HTML provides basic document formatting and allows the developer to specify "links" to other servers and files. Use of an HTML-compliant client browser involves specification of a link via a Uniform Resource Locator or "URL". Upon such specification, the client makes a tcp/ip request to the server identified in the link and receives a "web page" (namely, a document formatted according to HTML) in return.

There is a finite time period between the time the user initiates the link and the return of the web page. Even when the web page is returned quickly, there is an additional time period during which formatting information must be processed for display on the display interface. For example, most web browsers display in-line images (namely images next to text) using an X bit map (XBM) or .gif format. Each image takes time to process and slows down the initial display of the document. The user typically "sees" an essentially unrecognizable "image" on the display screen which only gradually comes into focus. It is only after the entire image is downloaded from the server and then processed by the browser that the user can fully access the web page itself. This "waiting" period is even longer when the client machine has a relatively slow modem, and often the user will have to wait many seconds before being able to see the in-line image and/or begin using the web page. This problem will be exacerbated when the next generation browser technology (such as Netscape Navigator 2.0) becomes more widely implemented because such browsers are being designed to handle much more complex download formats (for more interactive, dynamic displays).

BRIEF SUMMARY OF THE INVENTION

It is thus a primary object of the invention to enhance the operation of a web browser by causing the display of some useful information to the user during the period of user "downtime" that otherwise occurs between linking and downloading of a hypertext document identified by the link. Such information may include, without limitation, advertisements, messages, fill-in forms, notices from a service provider, notices from another Internet service (such as receipt of an e-mail message), or some third party notice.

It is another more particular object of the invention to use an Hypertext Markup Language comment (e.g., via an HTML comment tag) in a web page to store an information object related to a link and then formatting and displaying such information when the link is activated.

It is still another object of the invention to embed an information object within an existing web page so that the object is masked until a link to another web page is activated. Upon activation, the object is displayed to the user effectively as a "mini" web page while the browser calls the link and awaits for a reply and download.

For example, in one particular embodiment, the information object includes copyright management information for a hypertext document associated with a link in a currently-displayed page. Such

information may include the name or other identifying information of a copyright owner, terms and conditions for uses of the work within the hypertext document, and such other information as may be prescribed or desired. When the user "hits" the link in the current page, the copyright management information (which is already present in the browser) is displayed as the new document is being accessed and downloaded. The copyright management information, for example, may inform the user of the terms and conditions of how the copyrighted content being downloaded can then be reused. The "time" period normally associated with the download is thus productive for both the user (since he or she no longer has to sit and wait for the display) as well as to the content provider.

According to the preferred embodiment, there is described a method of browsing the Worldwide Web of the Internet using an HTML-compliant client supporting a graphical user interface and a browser. The method begins as a web page is being displayed on the graphical user interface, the web page having at least one link to a hypertext document preferably located at a remote server. In response to the user clicking on the link, the link is activated by the browser to thereby request downloading of the hypertext document from the remote server to the graphical user interface of the client. While the client waits for a reply and/or as the hypertext document is being downloaded, the browser displays one or more different types of informational messages to the user. Such messages include, without limitation, advertisements, notices, messages, fill-in forms, copyright information and the like. Preferably, the message information is in some way related to the hypertext document being accessed and downloaded, as in the case of copyright management information perhaps warning the user that the material being downloaded is subject to certain use restrictions of the copyright owner. Where the displayed information is related to the link, it is desirable that such information be embedded within the web page from which the link is launched. The information is preferably "hidden" within the web page using a hypertext markup comment tag.

The invention is preferably implemented in a computer having a processor, an operating system, a graphical user interface and a HTTP-compliant browser. In such case, the novel and advantageous features of the invention are achieved using a first means, responsive to activation of a link from a web page, for retrieving an information object masked within the web page, and a second means for displaying information from the information object on the graphical user interface as the browser establishes the link. Preferably, the information object is masked by an HTML comment tag, which may include other HTML tags nested therein to format the information in the object. This enables the support of complex "mini" web pages that are displayed and accessible to the viewer during otherwise nonproductive periods when the browser is busy processing links to other documents or web sites.

The foregoing has outlined some of the more pertinent objects of the present invention. These objects should be construed to be merely illustrative of some of the more prominent features and applications of the invention. Many other beneficial results can be attained by applying the disclosed invention in a different manner or modifying the invention as will be described. Accordingly, other objects and a fuller understanding of the invention may be had by referring to the following Detailed Description of the preferred embodiment.

Drawing Descriptions:

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention and the advantages thereof, reference should be made to the following

the advantages thereof, reference should be made to the following Detailed Description taken in connection with the accompanying drawings in which:

FIG. 1 illustrates a computer network in which the present invention is implemented;

FIG. 2 illustrates a client computer supporting an HTML-compliant Worldwide Web browser;

FIG. 3 is a flowchart diagram of a preferred method of the present invention for dynamic display of an information object during linking;

FIG. 4 is a representative graphical user interface illustrating browser navigation tools;

FIG. 5 is a representative web page illustrating a hypertext link;

FIG. 6 is a view of the HTML source code for the web page of FIG. 5;

FIG. 7 is an example of a modified version of the HTML source code for the web page illustrated in FIG. 5, showing an information object embedded therein through a comment tag; and

FIG. 8 is a representative screen display illustrating how the information object appears as a "mini" web page upon activation of the hypertext link in the web page of FIG. 5.

Description of
Preferred
Embodiments:

DETAILED DESCRIPTION

As represented in FIG. 1, the Internet is a known computer network based on the client-server model. Conceptually, the Internet comprises a large network of "servers" 10 which are accessible by "clients" 12, typically users of personal computers, through some private Internet access provider 14 (such as Internet America) or an on-line service provider 16 (such as America On-Line, Prodigy, Compuserve, the Microsoft Network, and the like). Each of the clients may run a "browser," which is a known software tool used to access the servers via the access providers. A server 10 operates a so-called "web site" which supports files in the form of documents and pages. A network path to a server is identified by a so-called Uniform Resource Locator or URL having a known syntax for defining a network connection.

The "World Wide Web" (WWW) is that collection of servers of the Internet that utilize the Hypertext Transfer Protocol (HTTP). HTTP is a known application protocol that provides users access to files (which can be in different formats such as text, graphics, images, sound, video, etc.) using a standard page description language known as Hypertext Markup Language (HTML). HTML provides basic document formatting and allows the developer to specify "links" to other servers and files. Use of an HTML-compliant client browser involves specification of a link via the URL. Upon such specification, the client makes a tcp/ip request to the server identified in the link and receives a "web page" (namely, a document formatted according to HTML) in return.

FIG. 2 shows a block diagram of a representative "client" computer in which the present invention is implemented. The system unit 21 includes a system bus or plurality of system buses 31 to which various components are coupled and by which communication between the various components is accomplished. The microprocessor 32 is connected to the system bus 31 and is supported by read only memory (ROM) 33 and random access memory (RAM) 34 also connected to system bus 31. The ROM 33 contains among other code the Basic Input-Output system (BIOS) which controls basic hardware operations such as the interaction and the disk drives and the keyboard. The RAM 34 is the main memory into which the operating system and application programs are loaded. The memory management chip 35 is connected to the system bus 31 and controls direct memory access operations including passing data between the RAM 34 and hard disk drive 36.

including, passing data between the RAM 34 and hard disk drive 36 and floppy disk drive 37. The CD ROM 42, also coupled to the system bus 31, is used to store a large amount of data, e.g., a multimedia program or large database.

Also connected to this system bus 31 are various I/O controllers: the keyboard controller 38, the mouse controller 39, the video controller 40, and the audio controller 41. The keyboard controller 38 provides the hardware interface for the keyboard 22, the controller 39 provides the hardware interface for the mouse (or other point and click device) 23, the video controller 40 is the hardware interface for the display 24, and the audio controller 41 is the hardware interface for the multimedia speakers 25a and 25b. A modem 50 enables communication over a network 56 to other computers over the computer network.

The operating system 60 of the computer may be DOS, WINDOWS 3.x, WINDOWS '95, OS/2, AIX, or any other known and available operating system, and each computer is sometimes referred to as a machine. RAM 34 also supports a number of Internet access tools including, for example, the HTTP-compliant web browser 62. Known browser software includes Netscape, Netscape Navigator 2.0, Mosaic, and the like. The present invention is designed to operate within any of these known or developing web browsers, which are preferably modified as described herein to achieve the dynamic display of information objects during web site linking activities. RAM 34 may also support other Internet services including simple mail transfer protocol (SMTP) or e-mail, file transfer protocol (FTP), network news transfer protocol (NNTP) or "Usenet", and remote terminal access (Telnet).

HyperText Markup Language uses so-called "tags," denoted by the <> symbols, with the actual tag between the brackets. Most tags have a beginning () and an ending section, with the end shown by the slash symbol (/). There are numerous link tags in HTML to enable the viewer of the document to jump to another place in the same document, to jump to the top of another document, to jump to a specific place in another document, or to create and jump to a remote link (via a new URL) to another server. Links are typically displayed on a web page in color or with an underscore. In response to the user pointing and clicking on the link, the link is said to be "activated" to begin the download of the linked document or text. For more details on HTML, the reader is directed to the HTML Reference Manual, published by Sandia National Laboratories, and available on the Internet at "http://www.sandia.gov/sci_compute/html.ref.html" or the HTML Quick Reference, published by the University of Kansas, and available on the Internet at "http://kuhttp.cc.u.kans.edu/lynx_help/HTML_quick.html". Each of these publications are incorporated herein by reference.

A known HTML tag is a "comment," which typically allows a web page developer to include text that is to be ignored by the browser. The syntax for a "comment" tag is denoted . HTML is an evolving language. Recent standards for new versions of this language propose to add SGML comment syntax to HTML elements. This proposal would begin a comment with a double dash encountered inside any HTML element (but no inside quotes), and treat every thing as comments (including any " ", " ", or quote character) until the next occurring double dash. Such syntax allows HTML elements within a comment.

According to the present invention, an information "object" is preferably placed within a comment tag of a web page and thus is "ignored" by the browser in the formatting of the document then being displayed. This information object, however, is also saved to a separate file or cache within the client. A particular web page may have multiple information objects, with one or more objects

associated with one or more links in the documents. Thus, for example, if the document has two links, one information object is associated with the first link and a second information object is associated with a second link, and so on. Or, multiple information objects may be associated with a single link. Or, the information object(s) may have no direct relation to the content of any link in the document. While in the preferred embodiment an HTML "comment" tag is used to mask the information object, those skilled in the art will recognize that other HTML commands and tags may be used for this purpose as well including, for example, tag dedicated to masking an information object within the currently-displayed page. For example, an information object may be hidden within a clickable image identified with an ismap tag. Also, an information object may be formatted as a "mini" web page by nesting HTML elements within a particular HTML comment tag.

As noted above, a web browser 62 running on the client uses a TCP/IP connection to pass a request to a web server running a HTTP "service" (under the WINDOWS operating system) or "daemon" (under the UNIX operating system). The HTTP service then responds to the request, typically by sending a "web page" formatted in the Hypertext Markup Language, or HTML, to the browser. The browser then displays the web page using local resources (e.g., fonts and colors).

A preferred operation of the inventive method is illustrated in the flowchart of FIG. 3. The method begins at step 70 as a current web page is being displayed on the graphical user interface of the computer. It is assumed that this web page has embedded therein one or more comment tags, each of which (or perhaps several of which in combination) define an information object. Generally, although not required, each information object will be provided for one or more links in the web page being displayed. However, because the information object is embedded within a comment tag, it is hidden or "masked" and thus is ignored by the display routines of the browser. In step 72, the method saves or stores the information object in memory or some dedicated portion of the RAM (e.g., a cache) so that it may be easily and quickly obtained. At step 74, a test is made to determine whether a link associated with the information object has been activated. If so, the method continues at step 76 and issues a tcp/ip request to the network (assuming the link was to a URL). Step 78 represents the handshaking period during which the client waits for the appropriate response from the server. During this period, the client retrieves the information object (at step 80) and outputs the information (in step 82) to the user on the display. Steps 80 and 82 are shown in parallel to the handshaking and wait step 78 to emphasize the inventive concept of displaying useful information to the viewer during the link process. At step 84, a test is then performed to determine whether the download and refresh of the display is complete. If so, the routine saves the information object at step 86 and opens up access to the hypertext document at step 88.

FIG. 4 shows the browser navigation tool prior to download of the U.S. Patent and Trademark Office page (available at <http://www.uspto.gov>). FIG. 5 shows the web page as it exists on the display. This web page has various links including "Welcome to the United States Patent and Trademark Office." FIG. 6 shows the HTML source code used to generate the web page of FIG. 5, and FIG. 7 shows this source code modified to include an information object 75 within a comment tag. This object displays the message "The PTO Welcomes You" when the "Welcome to the United States Patent and Trademark Office" link is activated. FIG. 8 shows the effect of this information object when the routine of FIG. 3 is carried out.

Although the invention has been described in terms of a preferred embodiment, those skilled in the art will recognize that various modifications of the invention can be practiced within the spirit and scope of the appended claims. Thus, for example, the information supplied to the user during the period between link activation and downloading of the hypertext document need not be merely a visual output. It is also envisioned that some or all parts of a particular message be conveyed to the user aurally (via a multimedia speaker set, for example) as well as on the display screen. The message itself may be retained on the screen as an inline image or other text along with the downloaded hypertext document, and the browser includes appropriate means to queue the message to print and/or to save the message or allow the user to compose a response to the message. One such technique for responding to the message uses the HTML "fill-in" form tags. The browser may be suitably programmed to queue the mini web page for background printing whenever the link is activated.

Moreover, although in the preferred embodiment it is envisioned that the hypertext document (associated with the web page link) is located on a remote server, this is not a limitation of the invention. The display of informational messages may be effected whenever a link is activated, regardless of the location of the target document. Also, while the preferred embodiment has been described in the context of an Internet browser, the techniques of the invention apply whether or not the user accesses the Worldwide Web via a direct Internet connection (namely using an Internet access provider) or indirectly through some on-line service provider (such as America On-Line, Prodigy, Compuserve, the Microsoft Network, or the like). Thus the "computer network" in which the invention is implemented should be broadly construed to include any client-server model from which a client can link to a "remote" document (even if that document is available on the same machine or system).

It should also be appreciated that while in the preferred embodiment the information object is formatted and displayed upon activation of a link in a web page being currently displayed, this is not a limitation of the invention either. The information object need not be embedded within an existing web page, but rather may be embedded within the home page of the browser or supported elsewhere within the client itself. Thus, the information object may be displayed whenever a call to a web page is made, such as when a search to a particular URL is initiated, or when a previously-stored URL is launched (e.g., from a "View Bookmark" pulldown menu). Moreover, the client may store random information objects in the form of information advertisements (which in turn may include .gif files to produce images) so that the browser may call any such information at random. The browser may even be programmed to select which of the plurality of information objects to display based on a comparison of the type of web pages accessed by the user. Thus, for example, if the user accesses web pages relating to a particular service, the browser may be programmed to identify this access history and select predetermined information objects that will be of interest to the user (given that history).

The information objects may themselves be HTML "fill-in" forms that are retained on the display screen and may be filled in with information that the browser can then deliver back to some third party service provider. This enables the information objects to be used as mini survey forms for interactive, on-line surveys and the like, which would be especially advantageous for web site providers or other third parties.

As noted above, the information object may be automatically or selectively queued to the client printer upon display. This would enable the viewer to generate merchandise coupons and the like

related to the web page being accessed. Thus the web site provider could offer the viewer some added incentive for accessing its web page by causing the printing of a redeemable coupon or other information token (e.g., a discount card, a receipt, etc.). All of these actions are initiated during the otherwise downtime between web page access and download, thereby significantly increasing the value of the on-line informational content provided to the user.

As used herein, the "information object" or "information" output to the viewer during the link process should be broadly construed to cover any and all forms of messages, notices, text, graphics, sound, video, tables, diagrams, applets and other content, and combinations of any of the above.

One of the preferred implementations of the "browser" of the invention is as a set of instructions in a code module resident in the random access memory of the user's personal computer. Until required by the computer, the set of instructions may be stored in another computer memory, for example, in a hard disk drive, or in a removable memory such as an optical disk (for eventual use in a CD ROM) or floppy disk (for eventual use in a floppy disk drive). In addition, although the various methods described are conveniently implemented in a general purpose computer selectively activated or reconfigured by software, one of ordinary skill in the art would also recognize that such methods may be carried out in hardware, in firmware, or in more specialized apparatus constructed to perform the required method steps.

Finally, the present invention is designed to be implemented with conventional HTML and enhancements thereto (including HTML 2.0, HTML 3.0, HTML with third party-supplied extensions such as NHTML, and the like), by an HTML-compliant browser, such as Netscape, Netscape Navigator 2.0, Mosaic, MSN, as such existing or developed programs are modified to include the functionality of the invention described above. Netscape Navigator 2.0 has in-line support for platform-independent application objects (e.g., applets written in JavaScript, from Sun Microsystems). An applet resides on the server associated with a web page and is downloaded to the client browser after a link is established to the web page. The browser includes an engine for executing the downloaded applets. With this type of browser, the invention caches or otherwise stores a downloaded applet and later uses it, preferably when a new, related link is established. Thus, an "information object" according to the invention may include an applet which, for example, may generate an animated figure or icon, some aural output, a scrolling display, or a combination thereof. One of ordinary skill, however, will recognize that the inventive features of the invention, including the masking of "mini" hypertext documents within a web page and display of such documents upon link activation, may be applied to other Internet services as well as to HTTP compliant browsers. Thus, the invention would be useful to provide information to a user during an FTP access, an on-line chat, a posting to a bulletin board, or even during the sending and retrieval of e-mail. All such variations are considered within the scope of the invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is set forth in the following claims.

Foreign References: **none**

(No patents reference this one).

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Boolean Text



Advanced Text

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